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TB MED 503

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

OCCUPATIONAL AND ENVIRONMENTAL HEALTH

THE ARMY INDUSTRIAL HYGIENE PROGRAM

HEADQUARTERS, DEPARTMENT OF THE ARMY

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DEPARTMENT OF THE ARMY
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OCCUPATIONAL AND ENVIRONMENTAL HEALTH

THE ARMY INDUSTRIAL HYGIENE PROGRAM

			Paragraph	Page
CHAPTER	1.	INTRODUCTION		
		Purpose	1-1	1-1
		Introduction to industrial hygiene	1-2	1-1
		References	1-3	1-1
		Explanation of abbreviations and terms	1-4	1-1
		Responsibilities	1-5	1-1
	2.	DEPARTMENT OF THE ARMY OCCUPATIONAL SAFETY AND HEALTH (DA OSH) PROGRAM		
Section	I.	Introduction		
		Organization	2-1	2-1
		Authority	2-2	2-1
	II.	Department of the Army Occupational Health Program		
		Objectives	2-3	2-1
	III.	Department of the Army Industrial Hygiene Program		
		General	2-4	2-1
		Objectives	2-5	2-2
CHAPTER	3.	INSTALLATION INDUSTRIAL HYGIENE PROGRAM		
		General	3-1	3-1
		Essential industrial hygiene program elements	3-2	3-1
		Required industrial hygiene resources	3-3	3-3
	4.	OVERVIEW AND DIRECT SUPPORT CONCEPT OF THE INSTALLATION INDUSTRIAL HYGIENE PROGRAM		
Section	I.	Overview		
		General	4-1	4-1
		Recognition (LOHHI)	4-2	4-1
		Evaluation	4-3	4-1
		Control (hazard abatement plan)	4-4	4-1
	II.	Direct Support Concept		
		General	4-5	4-1
		IH program evaluations	4-6	4-1
		Results of IH program evaluations	4-7	4-1
		Checklist for IH program self evaluation	4-8	4-2
APPENDIX	A.	REFERENCES		A-1
	B.	SUPPORTING ACTIVITIES AND AREAS SERVED		B-1
	C.	A SELF-EVALUATION CHECKLIST FOR AN INSTALLATION IH PROGRAM		C-1
	D.	A SAMPLE INDUSTRIAL HYGIENE IMPLEMENTATION PLAN		D-1
	E.	RISK ASSESSMENT CODES		E-1
	F.	MINIMUM ESSENTIAL INDUSTRIAL HYGIENE EQUIPMENT		F-1
	G.	RECOMMENDED REFERENCE MATERIALS LIST		G-1
GLOSSARY				Glossary 1

CHAPTER 1
INTRODUCTION

1-1. Purpose. This bulletin—

a. Explains the organization and responsibilities of the industrial hygiene (IH) portion of the Army Occupational Health (OH) Program (hereinafter referred to as the IH Program).

b. Provides guidance and establishes policy for the operation and evaluation of an installation IH program.

c. Describes the essential program elements, required resources, and management of an installation IH program.

1-2. Introduction to industrial hygiene. Industrial hygiene is that science and art devoted to the *recognition, evaluation,* and *control* of those environmental factors and stresses associated with work and work operations that may cause sickness, impaired health and well being, or significant discomfort and inefficiency among workers or among the citizens of the community.

a. Recognition. Recognition of environmental factors and stresses that influence health requires an understanding of work operations and processes. The categories of stresses most frequently of interest are—

(1) *Chemical* (in the form of liquid, dust, fumes, mist, vapor, or gas).

(2) *Physical energy* (such as ionizing and nonionizing radiation, noise and vibration, flying objects, and extremes of temperature and pressure).

(3) *Biological* (such as insects and mites, molds, yeasts, fungi, bacteria, and viruses).

(4) *Ergonomic.* (such as body position in relation to task, monotony, boredom, repetitive motion, worry, work pressure, and fatigue).

b. Evaluation. Evaluation of the magnitude of the environmental factors and stresses arising in or from the workplace is essential in predicting the probable effect on health and well being. By virtue of training and experience, and aided by quantitative measurement of the chemical, physical energy, biological or ergonomic stresses, the industrial hygienist can render an expert opinion as to the "healthfulness" of the work environment, either for short periods or for a lifetime exposure.

c. Control. When necessary to protect health, control measures are based on a thorough evaluation of the environmental factors or stresses. Control measures most frequently used are—

(1) Isolation of a process or work operation to reduce the number of persons exposed.

(2) Substitution of a less harmful material.

(3) Alteration of a process to minimize human contact.

(4) Ventilation and air cleaning to provide an atmosphere safe for human occupancy.

(5) Reduction of exposure by shielding, increasing distance, limiting time, or other administrative/engineering controls.

(6) Wet methods to reduce emission of dusts to the atmosphere (such as in abrasive blasting, lathing, and grinding operations).

(7) Good housekeeping (such as cleanliness of the workplace; proper waste disposal; adequate washing, toilet, and restroom facilities; adequate potable water and eating facilities; and proper control of insects and rodents).

(8) Personal protective equipment (such as special clothing and eye, hearing, and respiratory protective equipment).

1-3. References. Required and related publications are listed in appendix A.

1-4. Explanation of abbreviations and terms. Abbreviations and special terms used in this bulletin are defined in the glossary.

1-5. Responsibilities. *a. The Director of Army Safety in the Office of the Army Safety Program* will carry out the responsibilities defined in AR 385-10, paragraph 1-7*e.*

b. The Surgeon General (TSG) will provide overall development of Department of the Army (DA) policies and programs for the Army-wide Preventive Medicine Program as outlined in AR 40-5 chapter 1. Industrial hygiene is an element of the Army Preventive Medicine Program.

c. The major medical commanders allocating resources to installation IH programs will manage

all aspects of command implementation of TSG's policies regarding the IH Program.

d. The installation safety manager, as the designated installation occupational safety and health (OSH) official, will—

(1) Manage and administer a comprehensive OSH Program.

(2) Request industrial hygiene support for the OSH Program and provide feedback as appropriate.

(3) Perform liaison with the installation medical authority (IMA) on resource requirements to support the OSH Program.

(4) Manage the installation hazard abatement plan to include input of risk assessment codes (RACs) generated by occupational health personnel (para 4-4).

(5) Coordinate with the installation IH staff to identify hazardous areas (para 3-2*h, i, j,* and *k*).

(6) Coordinate worker education/training with OH and supervisory personnel (para 3-2*l*).

(7) Coordinate review of DOD Hazardous Materials Information System and Material Safety Data Sheets for hazardous products used at the installation with IH personnel.

e. The installation medical authority will—

(1) Provide basic occupational health services to include IH to all supported personnel and coordinate with the installation safety manager.

(2) Appoint an individual from the installation IH staff to manage the program.

(3) Provide IH resources per paragraphs 1-5*j*, 1-5*k*, and 3-3.

(4) Provide an occupational health representative for the OSH council (*i* below).

(5) Request mission services from a supporting activity (see glossary) when needed.

(6) Support the design review process (para 3-2*g*).

(7) Review contracts to insure that occupational health considerations are addressed.

(8) Develop and coordinate local regulations or supplements to Army regulations to establish the scope of the IH Program and identify responsibilities (see para 3-1).

f. The supporting activity (app B) will—

(1) Conduct IH surveys, special studies, consultations, and program evaluations or reviews.

(2) Tailor IH services provided to the needs of each OSH program through coordination with supported installation and major command.

(3) The *Commander, US Army Environmental Hygiene Agency (USAEHA)* will—

(*a*) Provide the services listed in (1) and (2) above that are beyond the capabilities of 10th Medical Laboratory and US Army Pacific Environmental Health Engineering Agency (USAPACEHEA).

(*b*) Provide for the development, coordination, and maintenance of the central Army occupational health hazards inventory.

g. Commanders at all levels will provide a safe and healthful work environment within their command as outlined in AR 40-5, chapter 1.

h. The installation OSH council will—

(1) Consider matters involving OSH.

(2) Make recommendations to the installation commander.

(3) Perform such additional tasks as the commander or council chairperson may direct.

i. The occupational health representative of the OSH council will provide—

(1) Input concerning specific occupational health aspects of the council responsibilities.

(2) Information and recommendations concerning required actions to implement applicable laws and regulations related to occupational health.

(3) Advice, guidance and coordination to the agency/activity responsible for determining required actions to comply with survey and inspection recommendations made by higher headquarters and other agencies.

(4) Data regarding illness and on any problems related to employee participation in job-related programs.

(5) Comments on items of health impact for the installation hazard abatement plan.

j. An individual appointed by the IMA (para *e*(2)) will act as *program manager.*

k. The installation IH staff will—

(1) Develop and update, annually, IH input into the OH document to clearly define goals and objectives in the area of IH (para 3-2*a*).

(2) Establish and maintain the Local Occupational Health Hazard Inventory (LOHHI) (para 3-2*b*).

(3) Develop the IH implementation plan (IHIP) (para 3-2*c*).

(4) Identify potential occupational health hazards and determine the degree of hazard severity (para 3-2*d*).

(5) Assign RACs to every hazard evaluated after coordination with other appropriate OH personnel and submit written reports for inclusion in the installation hazard abatement plan (para 3-2*e*).

(6) Maintain all records of IH activities (para 3-2*f*).

(7) Provide design review services (para 3-2*g*).

(8) Assist supervisory and other personnel in the development of an installation Respiratory Protection Program (para 3-2*h*).

(9) Support the Hearing Conservation Program (para 3-2*i*).

(10) Coordinate with the Safety Office to identify hazardous areas (paras 3-2*b*, 3-2*h*, 3-2*i*, 3-2*j*, and 3-2*k*).

(11) Coordinate with the radiation protection officer (RPO) to insure that ionizing and nonionizing sources are properly evaluated and controlled (para 3-2*k*).

(12) Coordinate worker education and training with safety and supervisory personnel (para 3-2*l*).

(13) Advise IMA of required IH resource requirements (para 3-3).

(14) Coordinate the review of the DOD Hazardous Materials Information System and Material Safety Data Sheets for hazardous products used at the installation with safety personnel.

l. *Managers* and *supervisors* will—

(1) Remain informed of actual and potential occupational safety and health hazards and requirements in activities under their control.

(2) Enforce the use of personal protective clothing and equipment and document any noncompliance.

(3) Coordinate worker education and training with OH and safety personnel (para 3-2*l*).

(4) Insure that employees are cognizant of work related health issues.

CHAPTER 2

DEPARTMENT OF THE ARMY OCCUPATIONAL SAFETY AND HEALTH (DA OSH) PROGRAM

Section I. INTRODUCTION

2-1. Organization. *a.* The responsibilities for OSH are divided into safety and health at the DA staff level with the safety functions defined in AR 385-10 and the health aspects in AR 40-5.

b. Occupational health services are provided at three levels of support for US Army activities: DA, installation, and major medical command. These three levels are defined as—

(*1*) *DA level.* Occupational health support of a technical and consultative nature in support of Army-wide preventive medicine programs where the nature of the services required is above the capabilities of the major medical command level and installation level.

(*2*) *Major medical command level.* Occupational health support of a technical, directive, and consultative nature to installation level preventive medicine programs.

(*3*) *Installation level.* Routine occupational health support provided by MEDDAC/MEDCEN preventive medicine personnel within their geographic area of responsibility.

2-2. Authority. *a.* The DA OSH Program is based on Federal law and DOD/DA policies and regulations. Military unique standards will be used when approved by TSG. In the absence of such standards, the more stringent requirements of Section 134, Part 1910, Title 29, Code of Federal Regulations (29 CFR 1910.134) (Occupational Safety and Health Standards) or the American Conference of Governmental Industrial Hygienists Threshold Limit Values will be used to protect the health of military and civilian personnel (AR 40-5, chap. 5).

b. Executive Order 12196 (Occupational Safety and Health Programs for Federal Employees) directed establishment of the OSH Programs for all Federal employees.

c. Department of Defense Directive 1000.3 and DOD Instructions (DODI) 6055.1, 6055.2, 6055.3, and 6055.5 provide definitive policy and guidance for implementation of OSH programs. These are the key documents that establish program organization, responsibilities, and staff relationships for all DOD personnel (both military and civilian) worldwide.

d. The DA OSH program is defined in AR 40-5 and AR 385-10.

Section II. DEPARTMENT OF THE ARMY OCCUPATIONAL HEALTH PROGRAM

2-3. Objectives. Objectives of the Army Occupational Health Program are to—

a. Assure that all eligible military and civilian personnel are physically, mentally, and psychologically suited to their work at the time of their assignment, and that physical and mental health are monitored to detect early deviations from the norm.

b. Protect military and civilian personnel against adverse effects of health and safety hazards in the work environment, to include field operation and industrial workplaces.

c. Assure proper medical care and rehabilitation of the occupationally ill and injured.

d. Reduce economic loss caused by compensation claims due to physical deficiency, sickness, and injury of military and civilian personnel.

e. Prevent performance degradation caused by occupational illness and injury of military personnel, thereby enhancing combat readiness.

Section III. DEPARTMENT OF THE ARMY INDUSTRIAL HYGIENE PROGRAM

2-4. General. *a.* Industrial hygiene is an essential element of the DA OSH and DA Occupational Health Programs. This section prescribes the manner in which all phases of the IH Program are established as an integral part of the overall OSH programs.

b. TB MED 504, Industrial Hygiene Manual (to be published) will contain requirements, guidelines, and technical procedures for recognizing, evaluating, and controlling potential health hazards at specific operations common to Army industrial activities.

2-5. Objectives. *a.* Assure that all potential health hazards in DA workplaces are identified and assessed.

b. Provide for systematic evaluation of potentially hazardous operations to insure the elimination or control of occupational health hazards.

c. Provide for the identification of DA civilian and military personnel who are required to be included in occupational health programs such as—

(1) Respiratory protection.
(2) Hearing conservation.
(3) Occupational vision.
(4) Pregnancy surveillance.
(5) Occupational health education.
(6) Radiation protection.
(7) Other job-related medical surveillance.

CHAPTER 3
INSTALLATION INDUSTRIAL HYGIENE PROGRAM

3-1. General. *a.* Local OSH policy will be established in either supplements to regulations or installation regulations and will—

(1) Define responsibilities for the IH elements as discussed in paragraph 3-2.

(2) Establish a mechanism for inclusion of occupational health hazards into the formal hazard abatement plan per AR 385-10 and AR 40-5.

b. An effective installation OSH program requires that good working relationships be established among all staff elements with OSH responsibilities. Written policy will be established to identify IH Program responsibilities for—

(1) Surveying industrial and other operations, making recommendations for controlling health hazards and reporting to include imminent danger situations, and followup of those recommendations.

(2) Assigning RACs to insure timely response to IH recommendations and input to the hazard abatement plan.

(3) Notifying the installation commander and supervisors of any *unhealthful* conditions.

(4) Supporting outlying activities (such as arsenals, depots, and ammunition plants).

(5) Transferring hazard information among the OSH team members.

(6) Reviewing initial design or modifications to operational equipment and processes to determine if any potential health hazards exist (para 3-2*g*). Review of equipment in the Health Hazard Assessment Program will not be done by local IH personnel.

(7) Maintaining the employee occupational health education program.

3-2. Essential industrial hygiene program elements. The items listed in this paragraph are the *minimum* essential elements required for an installation IH Program. A checklist for IH Program self-evaluation is shown in appendix C. The elements listed are required by Federal law, DA regulation and policy, or based upon consensus standards and good IH practice.

a. Program document.

(1) The installation IH Program and policies to implement the provisions of AR 40-5 will be established in a formal program document.

(2) This document will contain statements of mission, program objectives, goals, and procedures for implementation of each of the essential elements of the program (*b* through *l* below).

(3) The program document should be reevaluated at least annually to accomplish the requirements of the annual LOHHI and IHIP (*b* and *c* below).

b. Local Occupational Health Hazards Inventory (LOHHI). The key element of the Occupational Health Program is a current inventory of occupational health hazards. The inventory process is used to recognize occupational health hazards prior to their evaluation and control. Data entries will be performed per the procedures outlined in the LOHHI Coding Manual. Copies are available by writing to the Commander, US Army Environmental Hygiene Agency, ATTN: HSHB-AA, Aberdeen Proving Ground, MD 21010-5422.

(1) The LOHHI will be updated annually. It will encompass all potentially hazardous workplace operations and be updated continuously throughout the year. Information derived from sampling, monitoring, and evaluation activities will be used to supplement and update the annual inventory.

(2) The annual inventory may be accomplished in conjunction with and in support of the annual inspection and notification procedures described in AR 385-10.

(3) The LOHHI is a critical element in the OH Program development and should be used as a source—

(*a*) For budget and staffing resource requirements (para 3-3*a*).

(*b*) For documentation of IH equipment requirements (para 3-3*c*).

(*c*) To define sampling and monitoring activities required for the development of an annual IHIP.

(*d*) By OH personnel to identify potential OH hazards requiring job-related medical surveillance.

(4) The LOHHI serves as a toxic chemical inventory and may be supplemented by the DOL Hazardous Materials Information System and material safety data sheets maintained locally. A separate toxic chemical inventory compiling all chemicals used is not necessary.

c. Industrial hygiene implementation plan. The IHIP will be developed listing IH functions, resources available, and a priority schedule for accomplishing the required tasks. A sample IHIP is shown in appendix D. Implementation plans should—

(1) Include the update of LOHHI as a top priority.

(2) List the annual program service requirements (such as sampling, monitoring, and surveys).

(3) Schedule identified services by priority into the month or quarter they will be accomplished.

(4) Identify those services that should be accomplished by both installation IH and supporting activities (app B). The priority list of services beyond the local capabilities will be coordinated through the major command to the appropriate supporting activity per their mission services procedures and time tables.

d. Hazard evaluation.

(1) Potential occupational health hazards identified during the inventory process will require evaluation to determine the degree of hazard severity. Air sampling and ventilation measurements are common means of evaluation.

(2) The industrial hygiene staff of the appropriate supporting activity may be contacted for information concerning hazard evaluation or detailed sampling instructions (see app B).

(3) TB MED 504 (to be published) contains sampling instructions and other evaluation information, as well as information on recognition and control

e. RACs and the installation hazard abatement plan.

(1) All operations, exposures, and deficient control measures that create a potential for adverse health effects will be assigned a RAC by OH Program personnel. RACs are used to assign a priority for funding of corrective action at all levels and will reflect a comprehensive evaluation. A guide for determining RACs in the decision process is in appendix E.

(2) Identified health hazards with RACs will be submitted for inclusion into the installation hazard abatement plan by written report to the local DA safety manager. AR 385-10 contains detailed information on hazard abatement procedures.

f. Recordkeeping.

(1) *Worker exposure data.*

(*a*) Preventive medicine personnel will record the worker's exposure data on DA Form 4700 (Medical Record—Supplemental Medical Data) overprints. (Since the overprint is considered a new form, submit the completed DA Form 4700 for approval per AR 40-66, paragraphs 5-4, 6-3, and 7-3.) This data will then be forwarded to the medical record custodian for inclusion in the worker's health record and may be used for evaluation and counseling the worker on his or her exposure.

(*b*) Sample data that shows *no worker exposure* is important and will also be included in the worker's health record.

(*c*) The relationship of the period sampled to the employee's exposure for the shift(s) sampled will also be documented.

(2) *Workplace monitoring data.* The medical files that house the IH workplace monitoring records for—

(*a*) *Civilians* are governed by AR 340-18, file number 922-02.

(*b*) *Military* are governed by AR 340-18, file number 917-01.

(3) *Survey data.* Industrial hygiene survey files are maintained per AR 340-18.

(4) *Data files.* Preventive medicine data files are maintained per AR 340-18, file number 923-10. Types of records include—

(*a*) Health hazard inventories, evaluations of hazards, existing health hazard control measures, and recommendations for improvements.

(*b*) Toxic chemicals used and hazardous devices or processes. These records are kept as part of LOHHI so that potential problems may be identified. Ventilation flow rates, noise levels, and process variables should also be maintained to show effects of control measures.

g. Design review (AR 420-10).

(1) The installation IH staff will review the physical plant process for operational modifications, as well as new concept, design, or construction projects to insure potential health hazards are appropriately addressed.

(2) Highly technical or unusual designs or processes should be referred to the supporting ac-

tivity for assistance or consultation as necessary (AR 420-10).

(3) A representative from the preventive medicine staff should be a member of the installation planning board and the installation review board.

(4) A written memorandum of understanding will be formalized between the IMA and the director of engineering and housing for medical/technical review of projects mentioned in (1) above.

h. Respiratory protection. An ongoing Respiratory Protection Program that meets all the OSHA requirements (29 CFR 1910.134) is a key element to control occupational health hazards. Supervisory and OSH personnel should jointly develop an installation program that meets regulatory requirements. Detailed program information can be found in 29 CFR 1910 (subparts I and Z), TB MED 502, and AR 11-XX (to be published).

i. Hearing conservation. Hearing Conservation Program requirements are outlined in AR 40-5 and TB MED 501. Some IH functions within the program—

(1) Conduct annual noise surveys.

(2) Assign RACs to noise hazardous areas.

(3) Keep noise survey data on DD Form 2214 (Noise Survey) within the LOHHI.

(4) Identify exposed personnel.

(5) Recommend noise control measures.

j. Occupational vision.

(1) Occupational Vision Program requirements are outlined in TB MED 506.

(2) IH personnel, in coordination with the Safety Officer, will—

(*a*) Identify eye hazardous areas during the annual LOHHI update.

(*b*) Provide a list of eye hazardous areas to the occupational health clinic.

(*3*) Coordinate with the optometrist for technial guidance when assistance is needed.

k. Radiation protection. Radiation protection is a part of classical IH. However, on many installations the commander has designated a separate radiation protection officer (RPO) to manage the Radiation Protection Program. Ionizing radiation protection requirements are detailed in AR 40-5, AR 40-14, AR 40-37, AR 385-11, and TB MED 521. The nonionizing Radiation Protection Program is detailed in AR 40-5, AR 40-46, AR 40-583, TB MED 523, and TB MED 524.

l. Worker education/training. A program of education and orientation is necessary to insure employees are specifically informed about potential hazards, preventive measures, and proper operation of process and control equipment. This requires coordination among staff and supervisory personnel, employee representatives, and employees (civilian and military). Local health and safety committees should be used to educate workers through regular on-the-job training or safety meetings. Safety personnel have access to numerous publications on worker training and should be asked for help in establishing a program. OH personnel will provide input to installation training programs.

3-3. Required industrial hygiene resources. The operation of an effective IH program requires a significant commitment of resources to provide personnel, facilities, equipment, and reference materials.

a. Personnel. The staff responsible for the direction and operation of the IH program will—

(1) Be professionally qualified.

(2) Be adequate in number.

(3) Have technical direction by a competent industrial hygienist, regardless of installation size (see the glossary for the definition of industrial hygienist).

(4) Although certification by the American Board of Industrial Hygiene is not mandatory, such certification is considered a hallmark by IH personnel and is strongly encouraged. Commanders and supervisors of industrial hygienists must understand that there is a continuing investment required to keep the professional current. This means attendance at meetings and courses and travel to other installations. As a minimum, sufficient training should be provided to acquire and maintain an individual's certification. The Individual Development Plan and General Performance Appraisal System of the Civilian Personnel Office should be used to schedule annual training requirements for civilian personnel (AR 690-400). A similar training and development plan should be developed for military personnel and incorporated into the efficiency reporting system.

(5) Adequate staffing is achieved through documentation of program requirements, workload performed, work backlog, and manpower surveys. The IHIP is an excellent mechanism for demonstrating staffing requirements. For manpower requirements, refer to the current IH yardstick and appropriate staffing guides (DA Pam 570-557).

b. Facilities. Office, storage, and laboratory space must be provided for the IH program. These facilities will be of adequate quality and size and suitably located to perform the functions of the program. Normally, laboratory analysis will be

provided by a supporting activity. Therefore, laboratory space is needed primarily for user-maintenance, function testing, and calibration of equipment.

c. Industrial hygiene equipment.

(1) Equipment and instrumentation are required to support sampling and monitoring identified by LOHHI and IHIP.

(2) Equipment requirements for an installation program depend upon the industrial operations. Appendix F provides a list of equipment that may be used as a guide for selection and purchase. Check with the supporting activity (app B) for changes to appendix F prior to ordering equipment.

(3) All IH equipment will be properly calibrated to standards traceable to the National Bureau of Standards (see TB MED 504 (to be published)). The Army Calibration System will be used to insure proper traceability of standards (AR 750–25).

(4) Records of equipment maintenance and calibration will be kept and updated.

d. Reference materials. The field of IH is very broad and the professional must have sufficient reference materials available to effectively evaluate installation operations. These references may be programmed for purchase with IMA monies or through the supporting medical library. A recommended list of reference materials for the industrial hygienist is contained in appendix G.

CHAPTER 4

OVERVIEW AND DIRECT SUPPORT CONCEPT OF THE INSTALLATION INDUSTRIAL HYGIENE PROGRAM

Section I. OVERVIEW

4–1. General. The flow of the installation IH Program must be an orderly progression from *recognition* to *evaluation* and ultimately ending in *control* or elimination of each health hazard. This progression is depicted in figure 4–1.

4–2. Recognition (LOHHI). *a.* The LOHHI is used to keep a record of all operations with potential health hazards.

b. The LOHHI is a basis for the occupational health physicians and nurses to plan medical surveillance.

c. The completed LOHHI is necessary to develop an IHIP which is the next sequential step in developing a viable IH program.

4–3. Evaluation. *a. IHIP.* Information gained during the LOHHI will be used to establish a schedule of evaluations (IHIP). The most hazardous operations will be evaluated first. Those functions that cannot be accomplished with local resources should be used to—

(1) Defend and justify additional program resources such as manpower, equipment, and training funds.

(2) Establish mission services support required from a supporting activity.

b. Action Phase. The Action Phase simply denotes the actions required (identified within the IHIP) to fully evaluate the potential exposures recognized during the LOHHI annual visits. These actions would consist primarily of exposure measurements and sampling, and ventilation measurements.

c. RACs.

(1) The RACs may be generated from survey data obtained during LOHHI visits to the workplace or as a result of more indepth evaluation during the Action Phase. In most cases, it will not be possible to assign a RAC based solely on a LOHHI visit without further evaluation of the potential health hazard. For example—

(*a*) The requirement for a local exhaust ventilation system often necessitates extensive sampling to demonstrate and define the risk.

(*b*) The requirement for a deluge shower or eye lavage (in an area where corrosive/caustic chemicals present a splash hazard) can be documented during a LOHHI update survey.

(2) In either case, the industrial hygienist, in concert with other OH professionals, will insure that the RAC (app E) accurately reflects the health hazard as it exists. A higher RAC will not be assigned simply to get a control action accomplished.

4–4. Control (hazard abatement plan). Abatement requirements will be communicated and coordinated with the safety officer. For health hazard abatement requirements to be entered into the installation's abatement plan, each requirement will be identified with a RAC. In the case of health hazards, the final determination of the RAC is the sole responsibility of OH personnel.

Section II. DIRECT SUPPORT CONCEPT

4–5. General. At installations where the local IH program has not developed sufficiently to allow for the identification of needed support services, the *Direct Support Concept* insures that local activities are addressing the pertinent program elements within their areas of responsibility.

4–6. IH Program evaluations. Formal program evaluations will be scheduled and conducted by the MACOM preventive medicine staff element or upon request by a supporting activity. The evaluations are an indepth review of the local IH program. The purpose of the evaluation is to define the technical and program needs.

4–7. Results of IH Program evaluations. The information gathered from program evaluations may be used to—

a. Validate local IH program support requirements.

b. Update supporting activity service requirements.

c. Conduct onsite and problem-solving consultations with OH personnel concerning needed IH program improvements.

d. Determine the effectiveness and completeness of the installation IH program.

4–8. Checklist for IH program self evaluation. An outline of topics discussed during program evaluations is contained in appendix C. This outline should be used to periodically review and update installation IH programs.

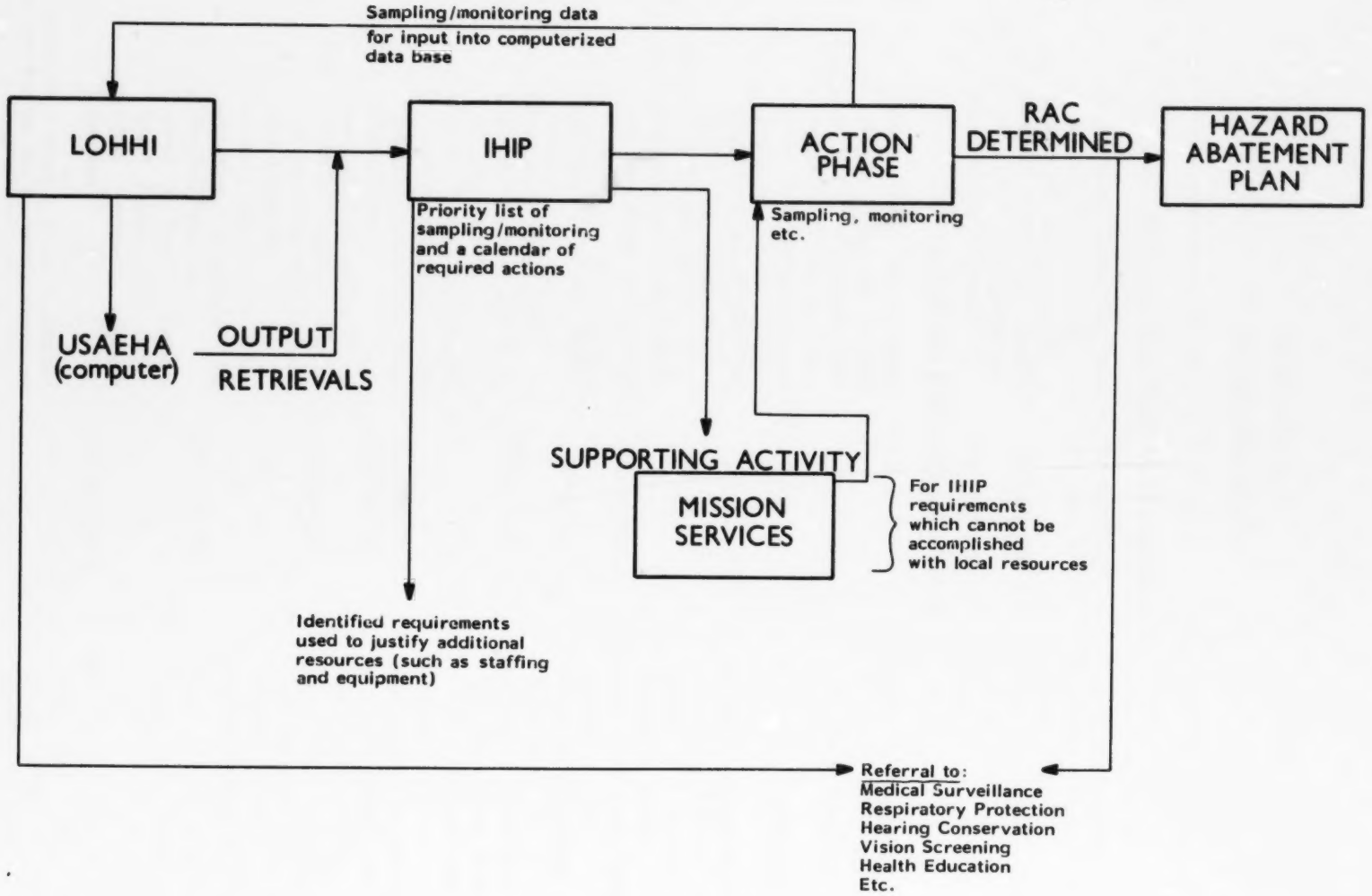

Figure 4-1. Flow of the Industrial Hygiene Program.

APPENDIX A
REFERENCES

Section I. REQUIRED PUBLICATIONS

AR 11-XX	Respiratory Protection Program (to be published)
AR 40-5	Health and Environment
AR 40-66	Medical Record and Quality Assurance Administration
AR 385-10	Army Safety Program
TB MED 501	Hearing Conservation
TB MED 502	Respiratory Protection Program
TB MED 504	Industrial Hygiene Manual (to be published)
TB MED 506	Occupational Vision

Section II. RELATED PUBLICATIONS*

DODD 1000.3	Safety and Occupational Health Policy for the Department of Defense (Department of Defense Directives and Instructions are available from HQDA (DASG-OPA), WASH, DC 20310-2300, telephone AUTOVON 227-1388.)
DODI 6055.1	Department of Defense Occupational Safety and Health Program
DODI 6055.2	Personal Protective Equipment
DODI 6055.3	Hearing Conservation
DODI 6055.5	Industrial Hygiene and Occupational Health
AR 40-10	Health Hazard Assessment Program in Support of the Materiel Acquisition Decision Process
AR 40-14	Control and Recording Procedures for Exposure to Ionizing Radiation and Radioactive Materials
AR 40-37	Licensing and Control of Radioactive Materials for Medical Purposes
AR 40-46	Control of Health Hazards from Lasers and Other High Intensity Optical Sources
AR 40-583	Control of Potential Hazards to Health from Microwave and Radio Frequency Radiation
AR 340-18	The Army Functional Files System
AR 385-11	Ionizing Radiation Protection (Licensing, Control, Transportation, Disposal, and Radiation Safety)
AR 385-30	Safety Color Code Markings and Signs
AR 385-32	Protective Clothing and Equipment
AR 420-10	Facilities Engineering: General Provisions, Organizations, Functions, and Personnel
AR 420-70	Buildings and Structures
AR 690-400	Employee Performance and Utilization
AR 750-25	Army Test, Measurement and Diagnostic Equipment (TMDE) Calibration and Repair Support Program
TB MED 279	Control of Hazards to Health from Laser Radiation (To be published as TB MED 524)
TB MED 521	Management and Control of Diagnostic X-Ray, Therapeutic X-Ray, and Gamma-Beam Equipment

*A related publication is merely a source of additional information. The user does not have to read it to understand this bulletin.

TB MED 523	Control of Hazards to Health from Microwave and Radio Frequency Radiation and Ultrasound	DA Pam 570-557	Staffing Guide for US Army Medical Department Activities

APPENDIX B
SUPPORTING ACTIVITIES AND AREAS SERVED

Supporting activity	*Area served*
US Army Environmental Hygiene Agency Regional Division North Fort George G. Meade, MD 20755-5225 AUTOVON 923-6205	Connecticut, Delaware, District of Columbia, Eastern Kentucky, Indiana, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Rhode Island, Vermont, Virginia, West Virginia.
US Army Environmental Hygiene Agency Regional Division South Fort McPherson, GA 30330-5000 AUTOVON 588-3234	Alabama, Arkansas, Florida, Georgia, Western Kentucky, Louisiana, Mississippi, Oklahoma, Panama, Puerto Rico, South Carolina, Tennessee, Central and Eastern Texas.
US Army Environmental Hygiene Agency Regional Division West Fitzsimons Army Medical Center Aurora, CO 80045-5001 AUTOVON 943-8881	Alaska, Arizona, California, Colorado, Idaho, Illinois, Iowa, Kansas, Michigan, Minnesota, Missouri, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oregon, South Dakota, West Texas, Utah, Washington, Wisconsin, Wyoming.
Commander US Army Pacific Environmental Health Engineering Agency Sagami APO San Francisco 96343 Camp Zama 228-4111	Hawaii, Japan, Korea, Okinawa, Philippines, Thailand, and all other Far East.
Commander 10th Medical Laboratory ATTN: Preventive Medicine Service APO New York 09180 Landstuhl Military (2223-)7387	Europe, Africa, Middle East.
Commander US Army Environmental Hygiene Agency ATTN: HSHB-OI Aberdeen Proving Ground, MD 21010-5422 AUTOVON 584-3161	Worldwide support to laboratories listed above

APPENDIX C
A SELF-EVALUATION CHECKLIST FOR AN INSTALLATION IH PROGRAM

C-1. Essential IH program elements. *a. Program document and local regulations* (para 3-2*a*).

(1) Has a program document been developed and written?

(2) Does the program document reflect the activities and program requirements of IH?

(3) Has the program document been reevaluated at least annually?

(4) Have sufficient local regulations been published to establish the basis for the IH program?

b. LOHHI (para 3-2*b*).

(1) Has a schedule for hazard evaluations been established?

(2) Has input been provided to other OH Program functions?

(3) Has information derived from sampling, monitoring, and evaluation activities been used to supplement and update the annual inventory?

c. IHIP (para 3-2*c*).

(1) Are all program service requirements identified by priority and updated annually?

(2) Are these services identified by priority in the month or quarter they are to be accomplished?

(3) Is a supporting activity used for completion of services beyond the capability of local resources?

d. Hazard evalulation (para 3-2*d*).

(1) Is periodic air sampling identified under the IHIP being accomplished?

(2) Are routine ventilation monitoring/verification and other inspections of workplaces being accomplished as scheduled in the IHIP?

e. RACs and the installation hazard abatement plan (para 3-2*e*).

(1) Are RACs received and included in the installation hazard abatement plan?

(2) Do health deficiencies receive funding for corrective action?

(3) Are completed control devices adequate for protection of worker health?

f. Recordkeeping (para 3-2*f*).

(1) How long are records of worker exposure maintained?

(2) Where are records of worker exposure maintained?

(3) Are sample results that show no worker exposure transferred to occupational medicine or nursing personnel?

(4) Is the relationship of sample period to employee exposure for the shift also documented?

(5) Are records of worker exposure, ventilation flow rates, noise levels, and other environmental monitoring results included in LOHHI?

g. Design review (para 3-2*g*)

(1) Is a formal mechanism for review established?

(2) Is the IMA represented on the Installation Planning Board and the Installation Review Board?

(3) Are all plans reviewed?

h. Respiratory protection (para 3-2*h*).

(1) Are respirators properly selected?

(2) Is medical monitoring adequate and conducted prior to respirator issue?

(3) Are areas designated which require respiratory protection?

(4) Are responsibilities of the program clearly outlined?

(5) How do OSH, logistics, and supervisors interface with the program?

i. Hearing conservation (para 3-2*i*).

(1) Who conducts annual noise survey and forwards the results with RACs for inclusion in the installation hazard abatement plan?

(2) Are exposed personnel referred for audiometric examinations?

(3) Who evaluates audiometric results and does occupational health receive feedback?

(4) Are hearing protectors properly selected?

(5) Are responsibilities of the program clearly outlined?

(6) How do OSH, logistics, and supervisors interface with the program?

(7) Who has ultimate responsibility for the Hearing Conservation Program?

(8) Does IH have input into the program and by what mechanism?

(9) Are noise-hazardous areas identified during annual LOHHI update included in the Hearing Conservation Program?

(10) Is a list of noise-hazardous areas provided to the occupational health clinic?

(11) Does installation/facility have noise sources?

(12) Is a hearing conservation officer designated by the commander?

(13) Does the IH have necessary coordination/involvement with the audiologist?

j. Occupational vision (para 3-2*j*).

(1) Who is responsible for managing the Occupational Vision Program?

(2) Does IH have input into the program and by what mechanism?

(3) Are eye hazardous areas identified during annual LOHHI update included in the Occupational Vision Program?

(4) Is a list of eye hazardous areas provided to the occupational health clinic?

(5) How do OSH, logistics, and supervisory personnel interface with the program?

k. Radiation protection (para 3-2*k*).

(1) Does the installation or facility have ionizing or nonionizing radiation sources?

(2) Is an RPO designated by the commander?

(3) Does the IH have necessary coordination/involvement with the RPO?

l. Worker education/training (para 3-2*l*).

(1) Is health information provided to other staff elements for use in *their* training classes?

(2) Are health related training classes presented?

(3) Are pertinent health education materials provided to employees and notices posted?

C-2. Program support, resources and relationships. *a. Personnel* (para 3-3).

(1) Is there secretarial and transportation support?

(2) Is the personnel staffing adequate?

(3) Is there manpower workload data collected?

b. Other IH resources (para 3-3).

(1) Are the facilities adequate for the mission?

(2) Is there adequate IH equipment and is it properly maintained?

(3) Is needed equipment programmed for MEDCASE/CEEP submissions?

(4) Is there calibration traceability?

(5) Are reference materials adequate?

c. Installation OSH council and IH program/installation relationships (para 1-5).

(1) *Installation OSH council.*

(*a*) Has a council been established?

(*b*) Are there occupational health representatives on the council?

(*c*) Are pertinent health related issues discussed?

(2) *IH program/installation relationships.*

(*a*) Are there relationships existing with the safety office, post engineers, commander, etc.?

(*b*) Are support agreements adequate?

(*c*) What is the disposition of IH reports (report and survey review—mechanism for forwarding of abatement requirements)?

(*d*) What is the relationship with the occupational health nurse or doctor?

APPENDIX D
A SAMPLE INDUSTRIAL HYGIENE IMPLEMENTATION PLAN

D–1. This IHIP was prepared to present a format for the priority scheduling of IH functions that can be used as a personnel and material resource management tool.

D–2. The first paragraph of the IHIP should state the purpose of the document. See figure D–1 for an example of this type of opening paragraph.

D–3. The schedule should be prepared to reflect anticipated workload and should be updated annually. A suggested format for the schedule is shown in figure D–1. The local IHIP will be more detailed than figure D–1. Specific buildings, operations, and administration tasks will be listed.

This document provides a schedule for the development and implementation of an Industrial Hygiene Program under the requirements of AR 40-5 and the Occupational Safety and Health Act of 1970 and is used to ensure safe and healthful working conditions for all military and civilian employees at (name of installation).

The implementation schedule is based on the present mission of (name of the facility) and existing industrial hygiene manpower allocations. The functions listed indicate all areas of the Industrial Hygiene Program. The priority scheme used in this plan follows--

1. Function has direct bearing on worker health.
2. Function is required by regulation or Federal law.
3. Function is recommended by an organization recognized as promulgating national consensus standards.

IH FUNCTION	PRIORITY	Jan Feb Mar Apr May Jun etc.
Annual Survey	(2)	1/12 of all areas to be surveyed should be scheduled each month.
Update of LOHHI	(1)	Should be performed in conjunction with annual survey.
Ventilation Systems Monitoring:		
a. Open surface tanks	(2)	Should be monitored periodically. (i.e. schedule 1/6 for each month).
b. Laboratory hoods	(3)	Should be monitored periodically. (i.e. schedule 1/6 for each month).
c. Spray paint booths	(2)	Should be monitored periodically. (i.e. schedule 1/6 for each month).
d. All other systems	(3)	Should be monitored periodically. (i.e. schedule 1/12 each month).
Initial determination of degree of exposure	(1)	All areas must be sampled or degree of exposure determined by some other method for any operation where exposure is possible. Schedule 1/12 each month.
Periodic sampling	(1)	The frequency of periodic sampling will be determined from the results of initial determination. For any operation for which exposure is more than 1/2 of PEL, sampling should be repeated at least annually. Exposure less than 1/2 the PEL should be sampled whenever operation changes such as an increase in production or a change in equipment production.
Noise exposure monitoring	(3)	All areas must be surveyed annually. Schedule 1/12 each month.
Periodic maintenance of equipment	(3)	Should be scheduled based upon recommendations of equipment manufacturers.
Calibration of equipment	(2)	Schedule as indicated by manufacturer or before each use.
Support of respiratory protection program	(2)	IH responsibilities will vary at installations and must be defined in local regulations.
Support of employee education program	(2)	Same as above.
Support of hearing conservation program	(2)	Same as above.
Support of occupational vision program	(2)	Same as above.

Figure D-1. A sample industrial hygiene implementation plan.

APPENDIX E
RISK ASSESSMENT CODES

Risk assessment codes (AR 385-10) quantify risk to personnel employed in a facility/plant/operation. Risk assessment is an expression of potential loss, described in terms of hazard severity, accident probability, and exposure to hazard. Subdefinitions follow.

a. Hazard Severity. An assessment of the expected consequence, defined by degree of injury or occupational illness, that could occur from a hazard. Hazard categories are assigned by Roman numeral according to the following criteria:

I—Death or permanent total disability
II—Permanent partial disability or temporary total disability in excess of 3 months
III—Lost workday accident/compensable injury/illness
IV—First aid or minor supportive medical treatment, or simply violation of standard

b. Accident Probability. An assessment of the likelihood that, given exposure to a hazard, an accident will result. Accident probability is assigned a capital letter according to the following criteria:

A—Likely to occur immediately
B—Probably will occur in time
C—Possible to occur in time
D—Unlikely to occur

c. Risk Assessment Code. An expression of the risk associated with a hazard that combines the hazard severity, accident probability, and personnel exposure into a single Arabic numeral.

1—Critical
2—Serious
3—Moderate
4—Minor
5—Negligible

Hazard severity	Accident probability			
	A	B	C	D
I	1	1	2	3
II	1	2	3	4
III	2	3	4	5
IV	3	4	5	5

APPENDIX F
MINIMUM ESSENTIAL INDUSTRIAL HYGIENE EQUIPMENT

Section I. TABLES

F-1. Equipment listed in tables F-1 and F-2 by trade name, make, or catalog number will be regarded as indicating an acceptable level of quality and will not be construed as limiting competition. Listing in these tables will not, by itself, be used as justification for a sole source procurement.

F-2. The information in tables F-1 and F-2, as well as additional information, can be found in the current edition of *Catalog and Buyers Guide.* (Copies are available from Industrial Hygiene News, Computer Center, 8650 Babcock Blvd., Pittsburgh, PA 15237.)

Table F-1. Recommended sampling equipment.

Quantity	Description	Model/manufacturer
2 ea	Sound Level Meter	1565B, Genrad Inc., NSN 6625-00-912-6149.
	Sound Level Meter Calibrator.	GR 1987, Genrad Inc.
	Sound Level Meter & Calibrator Kit w/ carrying case.	NSN 6625-00-236-1204, Genrad Inc.
2 ea	Air Velocity Meter	Model 1650, TSI, Inc.
1 ea	Dwyer Air Velocity Meter (Pitot Tube Kit).	Dwyer Instruments, Inc., Model 400-10.
1 ea	Light Meter, cosine Corrected.	Model 614, Weston.
1 ea	Calibrator, Mass Flow/ Bubble Meter.	Model 541S, Kurz Inst Inc.
1 ea	WBGT Index Kit	NSN 6665-00-159-2218.
1 ea	Aspirator Bulb (for smoke tube).	Part #16839, MSA. Part #14-085, Fisher Scientific Co.
1 bx	Smoke Tubes, 12/box	Part #5645, MSA.
	Smoke Tubes, 10/box	Part #CH-25301, National Draeger.
	Smoke Tubes, 10/box	Part #4-500, Sensidyne/Gastec.
1 ea	Thermometer to 220°F	NSN 6685-00-444-6500.
1 ea	Mercury Sniffer w/ Battery Charger (must specify) Part #36-220.	Mv-2 Bacharach, Part #23-7205.
1 ea	Co Monitor	Model 2108, Ecolyzer Energetics Science.
1 ea	Certified Span Gas for Calibration of CO Monitor.	Energetics Science.

Table F-1. Recommended sampling equipment.—Continued

Quantity	Description	Model/manufacturer
3 ea	Portable Personnel Air Samplers.	Model G. MSA Part 466117. Model P-2500, DuPont Co.
1 ea	Low-Flow, Constant Flow.	Model P-200, DuPont Co.
	Air Sampler (20 to 400 cc/min).	Model P125A, DuPont Co.
3 ea	Air Sampler Chargers	For Model G, MSA, Part #456059. For Model P-2500, DuPont. For Model P-200, DuPont.
1 ea	Gas and Vapor Detector	Sensidyne/Gastec, Part #7010657-1.
1 bx	0.8 μm Cellulose Ester Filter 37 mm, 100/bx (comes with support pads).	Millipore, Cat #AAWP 03700.
1 dz	Midget Impingers, Spillproof w/protective plastic covering.	DACO Products Inc., type SI-24.
1 bx	Type A Class Fiber Filters 37 mm, 500/box.	Gelman product #61715.
1 bx	5.0 μm PVC Filter, 37 mm 100/bx (comes with support pads).	Millipore Cat PVC-5-037-00.
2 ea	Cyclone Assembly, Complete.	MSA, Part #456243.
1 bx	Filter Backing Pads, 100/bx.	Millipore AP100 3700.
1 pk	50 complete filter cassettes, empty for 37mm Filters with Spacer Rings.	Millipore #M000 037 AO (for cassettes). Millipore #M000 037 RS (for spacers).
1 dz	Bulk Sample Containers	Arthur Thomas Co., Cat #2367-D10.
50 ea	Charcoal Tubes	SKC Inc., Cat #226-09.
4 bx	Carbon Monoxide Detector Tubes #1La.	Sensidyne.
2 bx	Nitrogen Dioxide Detector Tubes #9L.	Sensidyne.
1 bx	Trichloroethylene #132H.	Sensidyne.
1 bx	Toluene Tube #122	Sensidyne.
1 bx	Xylene Tube #123	Sensidyne.
1 bx	Ozone Tube #18L	Sensidyne.
1 bx	Formaldehyde Tube #91L.	Sensidyne.
1 bx	Ammonia Tube #3L	Sensidyne.

Table F-1. Recommended sampling equipment.—Continued

Quantity	Description	Model/manufacturer
1 bx	Methyl Chloroform Tubes #135.	Sensidyne.
1 dz	Midget Impingers, Complete.	Ace Glass, Inc., Cat #7531-10.
1 ea	Infrared Analyzer	Foxboro Analytical, Model 103.
1 ea	Tape Measure, 6 feet	NSN 5210-00-287-3335.
1 ea	Tape Measure, 50 feet	NSN 5210-00-234-6745.
1 ea	Flashlight	NSN 6230-00-163-1856.
1 ea	Screwdriver Set	NSN 5120-00-933-8979.
2 ea	Pistol Belts	NSN 8465-00-001-6488.
1 ea	60 yd roll Masking Tape	NSN 7510-00-266-6712.
1 dz	Hose Adapters for ¼ inch Tubing (Female Luer to Male Luer Slip).	MSA Coupler, Part #459743.
1 rl	¼ inch ID Sampling Tubing, (1 roll = 50 feet).	Arthur Thomas Co., Cat #9525-H32.
1 ea	Stop Watch	Arthur H. Thomas Co., Cat #8788-T10.

Table F-2. Supplemental sampling equipment

Quantity	Description	Model/manufacturer
1 ea	Alnor Velometer	Model 6000AP, Alnor Inc., Co.
1 ea	Tachometer, Photoelectric handheld.	Arthur H. Thomas Co., Cat #9062-T40.
1 ea	Combustible Gas & Oxygen Indicator (combination).	MSA or BioMarine.
4 ea	Air Sampling Pumps plus Chargers.	MSA or DuPont.
2 ea	Volume Samplers	Sensidyne Model 550, Part #3-1100-10.
200 ea	Volume Filters	Gelman, Cat #61696.
2 ea	Standard Impingers	Ace Glass Inc., Cat #7537-10.
2 ea	Large Fritted Impingers (Gas Washing Bottle) plus Medium Volume Pump.	Ace Glass Inc., Cat #7164-16. Staplex pump Model LV-1. Cat #8254-K10, Arthur Thomas Co.
4 ea	Cyclone Assemblies Complete.	MSA Part #456243.
50 ea	Charcoal Tubes	SKC Inc., Cat #226-09.
1 ea	Mercury Sniffer w/ battery charger (must specify).	Johnson-Williams, Div. of Bacharach Instrument Company, MV-2, Part #23-7205, charger Part #36-220.

Section II. NAMES, ADDRESSES, AND TELEPHONE NUMBERS OF MANUFACTURERS AND DISTRIBUTORS

Ace Glass Incorporated, 1342 Northwest Blvd., P.O. Box 688, Vineland, NJ 08360, (609) 692-3333.

Alnor Instruments, 7301 N. Caldwell Ave., Niles, IL 60648, (312) 647-7866.

Arthur H. Thomas Company, Vine Street at 3rd, P.O. Box 779, Philadelphia, PA 19105, (215) 574-4500.

Bacharach Inc., Co., 5100 Patrick Henry Drive, Santa Clara, CA 95050, (800) 835-2246.

Becton-Dickinson & Co., Rutherford, NJ 07070, (201) 460-2000.

BioMarine Industries Inc., 45 Great Valley Corporate Center, Malvern, PA 19355, (215) 647-7200.

DACO Products, Inc., 12 S. Mountain Ave., Montclair, NJ 07042, (201) 744-2453.

DuPont Company, Analytical Instruments Division, Wilmington, DE 19898, (302) 999-2552.

Dwyer Instruments, Inc., Box 373-T, Michigan City, IN 46360, (219) 872-9141.

Energetics Science, 6T Skyline Drive, Hawthorne, NY 10532, (914) 592-3010.

Fisher Scientific Company, 7722 Fenton Street, Silver Spring, MD 20910, (301) 792-2673.

Foxboro Co., 38 NE Ponset Ave., Dept. 124, Foxboro, MA 02035, (617) 543-8750.

Gelman Sciences Inc., 600 South Wagner Road, Ann Arbor, MI 48106, (800) 521-1520.

Genrad Inc., 300 Baker Ave., Concord, MA, (800) 343-4470.

HNU Systems Inc., 30 Ossipee Road, Newton, MA 02164, (617) 964-6690.

Interscan Corp., 21700 Nordhoff Street, Box 2496, Chatsworth, CA 91311, (213) 882-2331.

Jerome Instrument Corp., Box 336, Jerome, AZ 86331, (602) 634-4263.

Kurz Instruments Inc., P.O. Drawer 849, Carmel Valley, VA 93924, (408) 659-3421.

Lab Safety Supply, 3430 Palmer Drive, Box 1368, Janesville, WI 53547, (608) 754-2345.

Liquid Air Specialty Gas Div., Woods Road Box 149, Cambridge, MD 21613, (310) 228-6400.

Matheson, 30 Seaview Drive, Secaucus, NJ 07094, (201) 867-4100.

Metrosonics Inc., P.O. Box 23075, Rochester, NY 14692, (716) 334-7300.

Millipore Corporation, 80 Ashby Road, Bedford, MA 01730, (800) 225-1380.

Mine Safety Appliance Company, 600 Penn Center Blvd., Pittsburgh, PA 15235, (412) 273-5000.

National Draeger, Inc., P.O. Box 120, Pittsburgh, PA 15230, (412) 787-8383.

National Mine Service Co., 4900/600 Grant Street, Pittsburgh, PA 15219, (412) 281-0688.

Sensidyne Inc., 12345 Starky Road, Suite E, Largo, FL 33543, (813) 530-3602.

SKC, Inc., 395 Valley View Road, RD 1, Eighty Four, PA 15330, (412) 941-9701.

TSI, Inc., P.O. Box 3394, St. Paul, MN 55165, (612) 483-0900.

Weston Instrument Inc., 614 Frelinghuysen Ave., Newark, NJ 07114, (201) 242-2600.

APPENDIX G
RECOMMENDED REFERENCE MATERIALS LIST

G-1. Documentation of the Threshold Limit Values. Cincinnati: American Conference of Governmental Industrial Hygienists, current edition with annual supplements.

G-2. *Handbook of Noise Measurement.* Concord MA: General Radio, current edition.

G-3. *IES Lighting Handbook.* New York: Illuminating Engineering Society, 1981.

G-4. *The Industrial Environment—Its Evaluation and Control.* Washington, DC: Superintendent of Documents, Government Printing Office (GPO) 017-000-00396-4, 1973.

G-5. *Industrial Hygiene Field Operations Manual.* Washington, DC: Superintendent of Documents, Government Printing Office.

G-6. *Industrial Ventilation—A Manual of Recommended Practice.* Lansing MI: American Conference of Governmental Industrial Hygienists, Committee of Industrial Ventilation, current edition.

G-7. *Occupational Diseases: A Guide to Their Recognition.* Washington, DC: Superintendent of Documents, Government Printing Office (GPO) 017-033-00266-5, revised edition, 1977.

G-8.* *Patty's Industrial Hygiene and Toxicology.* New York: John Wiley & Sons, 3rd revised edition, Volume I, General Principles, 1978.

G-9. *Patty's Industrial Hygiene and Toxicology.* New York: John Wiley & Sons, 3rd revised edition, Volume II, Toxicology, 1981.

G-10.* *Patty's Industrial Hygiene and Toxicology.* New York: John Wiley & Sons, 3rd revised edition, Volume III, Theory and Rationale of Industrial Hygiene Practice, 1979.

G-11. *Pocket Guide to Chemical Hazards.* Cincinnati: Department of Health, Education, and Welfare, (NIOSH) 78-210, 1978.

G-12. Proctor, Nick H. and Hughes, James P. *Chemical Hazards of the Workplace.* Philadelphia: J. B. Lippincott Co, 1978.

G-13. Sax, N. Irving. *Dangerous Properties of Industrial Materials.* New York: Van Nostrand Reinhold Co, 5th edition.

G-14. *TLV's** *Threshold Limit Values for Chemical Substances and Physical Agents in the Workroom Environment with Intended changes.* Cincinnati: American Conference of Governmental Industrial Hygienists, published annually.

G-15. *American Industrial Hygiene Association Journal.* Akron, OH: American Industrial Hygiene Association.

G-16. *Basic Industrial Hygiene: A Training Manual.* Akron, OH: American Industrial Hygiene Association, 1980.

G-17. Hunter, Donald. *The Diseases of Occupation.* Boston: Little, Brown, 1975.

G-18. *Fundamentals of Industrial Hygiene.* Chicago, IL: National Safety Council, current edition.

G-19. *Engineering Field Reference Manual.* Akron, OH: American Industrial Hygiene Association.

*Indicates texts which are quite expensive ($100 each).

GLOSSARY

Section I. ABBREVIATIONS

CEEP	Capital Expense Equipment Program
CFR	Code of Federal Regulations
DA	Department of the Army
DOD	Department of Defense
DODI	Department of Defense Instruction
IH	industrial hygiene
IHIP	Industrial Hygiene Implementation Plan
IMA	installation medical authority
LOHHI	Local Occupational Health Hazards Inventory
MEDCASE	Medical Care Support Equipment
OH	occupational health
OSH	occupational safety and health
OSHA	Occupational Safety and Health Act
RAC	risk assessment code
RPO	radiation protection officer
TSG	The Surgeon General
USAEHA	US Army Environmental Hygiene Agency
USAPACEHEA	US Army Pacific Environmental Health Engineering Agency

Section II. TERMS

Industrial hygiene
That science and art devoted to the recognition, evaluation, and control of those environmental factors or stresses, arising in or from the workplace, which may cause sickness, impaired health and well being, or significant discomfort and inefficiency among workers.

Industrial hygiene implementation plan
A priority list of evaluation requirements and a schedule for accomplishment of these evaluations.

Installation
Includes DA activities, facilities and military community activities.

Installation medical authority
The unit surgeon, command chief surgeon, MEDDAC or MEDCEN commanders, and the director of health services or his or her representative responsible for provision of medical support at the unit, command, or installation concerned.

Installation safety officer
Principal staff adviser, technical consultant, and coordinator to the command and the staff in planning, organizing, directing, and evaluating all installation safety program elements (AR 385-10).

Occupational health personnel
Team consisting of two or more of the following specialties: OH physician, OH nurse, industrial hygienist, IH/OH technician, toxicologist, chemist, RPO, audiologist and optometrist.

Supporting activities
Activities that conduct field visits; provide technical assistance, laboratory analysis, and mission service reports; and conduct on-site and problem-solving consultations. There are supporting activities located throughout the world (see app E).

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